frontal region, the great terra incognita, has been in an uncer tain way irresistibly associated with higher psychic functions. The author's experience seems to support this view. Lesions of this region cause no disturbance of motion, of sensation, or of speech. "Yet for the coördination of facts into orderly series, for comparison, and for analysis of knowledge gained through the senses, the healthy state of the frontal lobes appears to be necessary. And lesions in the frontal region, especially upon the left side, are quite uniformly attended by mental dullness, apathy, lack of concentration and imperfect self-control." The functions of the basal ganglia, optic thalami and corpora striata, are still undetermined. If a lesion here does not invade the internal capsule, its presence can not be detected during life. The cerebellum Starr considers as the organ for control of bodily equilibrium.

In Chapter II. pp. 19-113, we have discussed at length trephining for epilepsy. Cases are clearly stated, and supplementing this a microscopical study of two of the cases by Van Gieson is given. The net result of operations reported is ten cases cured; six, improved; eleven, not improved; and two fatal. Trephining for imbecility due to microcephalus, Chap. III., 114-156, is an operation where the surgeon encounters great odds. Out of thirty-four cases, fourteen died, and five showed no improvement; while eight were somewhat, and seven greatly, improved. When gross atrophies are present, surgical interference is of no avail; but when brain tissue has been arrested in its development by cysts, clots, or tumors, or by early union of sutures, the removal of these disturbing conditions by giving more space may result in stimulating growth and in improvement or cure. Chapters follow upon trephining for cerebral hemorrhage, for abscess and for tumor of the brain. In this last field Starr has added to his 300 cases of brain tumor in patients under twenty years, 300 from adults; and his table combining the two lists of cases shows some striking facts touching the relative frequency of various kinds of tumor at different ages. Tumors of tubercular origin are more than three times (152 to 41) as frequent in children as in adults. Also tumors of the cerebellum, pons and medulla are more than twice as numerous in children. Of the whole 600 tumors, for reasons of character and position, only forty-six were clearly open to operation and only thirty-seven, about six per cent., could probably have been successfully removed. Trephining for insanity, Chap. VIII., has proved of service in the rare cases, about two per cent., where insanity has developed immediately after serious injury to the head. It has also been tried, both in this country and in England, for the relief of general paresis, but without effect, or accompanied with only such temporary improvement as may occur in any case of this disease.

Trephining for headache, Chap. XIX., has been successful in two cases, in both of which the disease was of traumatic origin and sharply localized. The book closes with a chapter on the operation of trephining, which is of purely technical interest.

The Sensory Motor Functions of the Central Convolutions of the Cortex Cerebri. F. W. MOTT. Brit. Med. J., II. pp. 685-7. 1893.

The point of this research consists in the very satisfactory evidence which it brings to bear upon the sensory functions of the so-called motor areas. The work was done chiefly on monkeys, portions of the brain being removed with a Horsely brain knife. Definite regions were paralyzed in this way and after determining these, sensibility was tested by spring clips of different strengths

applied to the skin. The animals reacted uniformly, always removing the clips from the side unaffected by the lesion in the brain, and in general not noticing them on the paralyzed side. The natural explanation is, of course, that the animal is unconscious of sensation upon that side. A more detailed account of these experiments may be looked for in an early number of the *Journal of Physiology.*

Preliminary Observations on Some Changes Caused in Nervous Tissues by Reagents Commonly Used to Harden Them. HENRY H. DONALDSON. Jour. of Morphology, Vol. IX., pp. 123-166. Boston, 1894.

This paper casts a shade of doubt over the records of brain weights as they are usually accepted. Unless it is known exactly how any particular brain has been treated before weighing, the weight as recorded may be anywhere between thirty per cent. too large and thirty per cent. too small. In general, bi-chromate of potash solutions swell, while alcohol has a tendency to shrink the brain, and these processes may even pass beyond the limits indicated above. A large number of experiments were made on sheep's brains in a number of different solutions, and the general reactions recorded. To have the research cover as much of the field as possible, these were then repeated upon sharks' brains and upon a series of human brains. Results were in all cases entirely similar. All possible variations of temperature, strength of solution, manner of cutting the brain, degree of dryness, drainage, age of individual, length of time post mortem, etc., were taken into careful account, so that with these data at hand, it is now possible to correct the weight of any given brain to its original weight when fresh.

In the gross changes, however, we have but a small part of the value of this research. The brain swells or shrinks on account of changes taking place in its tissue elements, the nerve cells. The sizes of these may, therefore, be far from normal, as given by the text-books. For consideration of this side of the subject, we must await a subsequent chapter. The paper should be in the hands of everyone who is contributing to neurological science. We confess to some disappointment in not finding an explicit set of directions for obtaining the most nearly correct weight of the brain possible, the outline of a method which would unify and make comparable the work of different observers. Gathering some such statement from the article, we should say that the brain should be weighed fresh, as it comes from the skull, with pia intact. A note should record whether the olfactory bulbs and pituitary body have been retained, and describe where the division between medulla and spinal cord has been made. The state of the blood vessels should also be described. If immediate weighing is not possible, careful note should be taken of all treatment to which it is subjected up to the time at which it is weighed.

An enormous amount of work has been condensed into little more than twenty pages by stating nearly all the results in tabular form. The tables, forty-eight in number, give the briefest and clearest statement of the case possible, and make the data easily accessible for reference.

Brain Preservation, with a Résumé of Some Old and New Methods. PIERRE A. FISH. The Wilder Quarter-Century Book, pp. 385-400, 1 Plate.

This will be found a convenient compendium of some of the better methods of brain preservation, chiefly with reference to